Exhibit A: Proposed Construction for Each Disputed Term, Supporting Evidence, and Requested Factual Findings

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"at least two regions having different material properties" Asserted claims 1 and 29	at least two regions within the semiconductor element that have different material properties **Intrinsic Evidence** '643 Patent: 2:24-43, 2:59-66, 3:27-32, 3:65-4:56, 5:45-53, 6:19-33, 7:9-47, 9:27-34, 11:5-12:6, 12:25-30, 12:44-50, 13:25-47, 15:26-30; Figs. 2a-2c, 7d, 8d. '643 Prosecution History: May 2012 patent application; August 2012 request for participation in the PPH program (including the translation of a March 19, 2012, statement regarding patentability from the National Board of patents and Registration in Finland); and June 2014 Notice of Allowability (including the interview summary with the examiner, reasons for allowance, and conclusion). **Extrinsic Evidence** Expert Testimony/Factual Findings: Dr. Meinhart will provide testimony that explains the plain meaning of the disputed phrase to one of ordinary skill in the art in the context of the intrinsic record, which is set forth in VTT's construction. The testimony will also explain the examples of "regions" in the specification,	"two or more regions that are formed of either (i) distinct regions with different material properties or (ii) a gradient of one or more continuously varying material properties, the regions being designed so that the temperature coefficients of the materials for the regions cancel each other to the claimed level" **INTRINSIC EVIDENCE:** *See, e.g.*, '643 Patent, abstract, C2:24-48, C2:59-C3:11, C3:27-C4:56, C5:12-20, C5:37-44; C5:19-33, C13:40-44; C15:26-30, C12:25-30, C13:1-17, C13:25-47 & FIGs. 1, 2a-c, 7-11. **EXTRINSIC EVIDENCE:** "Strength of Materials" Parts I and II by Stephen Timoshenko. Prior art cited in Defendant's P.L.R. 3-4 Invalidity Contentions. [SITIME_VTT_0019969 – SITIME_VTT_0021396]. Expert Testimony: Defendant may offer testimony of Dr. Clark Nguyen in a declaration explaining why

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	including the various properties of the regions and their construction. The testimony will also explain how the regions with different material properties interact and act together in response to changing temperatures, and how the claim language sets forth those requirements. The testimony will further explain that the examples of regions in the specification do not disavow or otherwise limit the plain meaning of the disputed claim term. VTT will seek factual findings from the Court consistent with this testimony. • *2009 Collins Dictionary* at 1383 (region: any large, indefinite, and continuous part of a surface or space.) • *2011 American Heritage Dictionary* at 1479 (region: a large, usually continuous segment of a surface or space.)	Defendant's construction is consistent with how a person of ordinary skill in the art would have understood the term at the time the purported invention in the '643 patent was made in the context of the claims, specification, and the prosecution file history. Defendant may also offer testimony of Dr. Nguyen explaining the types of regions described in the patent and how they are designed to interact with each other in response to increased/decreased temperatures to cancel or reduce temperature drift in the overall composite structure.
"being configured so that the temperature sensitivities of the generalized stiffness are opposite in sign at least at one temperature for the regions" Asserted claim 1	being configured so that, at least at one temperature, the generalized stiffness of one region is increasing with increasing temperature and the generalized stiffness of a second region is decreasing with increasing temperature **Intrinsic Evidence** '643 Patent: 2:59-3:7, 3:16-26, 3:32-60, 3:65-4:56, 5:6-20, 5:31-44, 6:23-29, 8:7-11, 9:5-60,	"designed to ensure the temperature coefficients of the effective elastic modulus of the at least two regions are of opposite sign" **INTRINSIC EVIDENCE:** *See, e.g.*, '643 patent, abstract, C1:19-28, C2:59-C3:11, C3:16-44, C3:33-60, C5:31-44, C6:19-33, C7:14-18, C10:37-41, C12:25-30, C13:25-47, C13:48-65, C14:7-C15:38, C15:26-

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	10:37-54, 12:15-54, 13:25-15:38; Figs. 2a-c, 3a-c, 4a-c, 5a-c, 6a-c, 7a-d, 8a-d, 15a-15c, 16a-d, and 17. '643 Prosecution History: May 2012 patent application; August 2012 request for participation in the PPH program (including the translation of a March 19, 2012, statement regarding patentability from the National Board of patents and Registration in Finland); and June 2014 Notice of Allowability (including the interview summary with the examiner, reasons for allowance, and conclusion). **Extrinsic Evidence** Expert Testimony/Factual Findings: Dr. Meinhart will provide testimony that explains the plain meaning of the disputed phrase to one of ordinary skill in the art in the context of the intrinsic record, which is set forth in VTT's construction. For example, the testimony will describe the elastic parameters of semiconductor material and the impact of material properties of the regions of the semiconductor element on those elastic parameters, such as volumes, dopants, doping concentration, crystal orientation, and geometry for a particular resonant mode. In addition, the testimony will explain models for determining generalized stiffness of the semiconductor element, including the relationship between the	30, FIGs. 1, 2a-c, 7-11, 15a-c, 16a-d & FI 20115151. **EXTRINSIC EVIDENCE:** "Strength of Materials" Parts I and II by Stephen Timoshenko. Prior art cited in Defendant's P.L.R. 3-4 Invalidity Contentions. [SITIME_VTT_0019969 – SITIME_VTT_0021396]. Expert Testimony: Defendant may offer expert testimony of Dr. Clark Nguyen in a declaration explaining why Defendant's construction is consistent with how a person of ordinary skill in the art would have understood the term at the time the purported invention in the '643 patent was made in the context of the claims, specification, and the prosecution file history. Defendant may also offer testimony of Dr. Nguyen, including (i) characterizing the at least two different regions, (ii) explaining how the temperature drift of the regions is designed so that the summation of the overall temperature drift across the MEMS resonator structure is different from that of the individual regions, and (iii) explaining how the MEMS resonator is designed to guarantee the

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	temperature coefficient of frequency and the generalized stiffness of a material. The testimony will further explain how the generalized stiffness changes as the temperature of the semiconductor material varies due to the influence of temperature on the elastic parameters of the semiconductor for a particular resonant mode, including the related disclosures in the patent. The testimony will also describe how the temperature sensitivities of particular regions of the semiconductor element can be determined, characterized, and compared. In addition, the testimony will explain the meaning of "opposite in sign" in the context of the "temperature sensitivities" and the intrinsic evidence. For example, the testimony will explain that the two regions have a temperature sensitivity that is opposite in sign at a particular temperature when the generalized stiffness of one region is increasing with increasing temperature and the generalized stiffness of a second region is decreasing with increasing temperature. VTT will seek factual findings from the Court consistent with this testimony. *2009 Collins Dictionary* at 1492 (The state, condition, or quality of reacting or being sensitive to an external stimulus, drug, allergen, etc.; electronics The magnitude or time of response of an instrument, circuit, etc, to an input signal, such as a current.)	elastic parameters of the regions exhibit opposite sensitivities to temperature changes.

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	2011 American Heritage Dictionary at 1596 (The degree of response of a receiver or instrument to an incoming signal or to a change in the incoming signal, as in FM radio)	
"the overall temperature drift of the generalized stiffness of the semiconductor element is less than 50 ppm" Asserted claim 29	the total variation (including first and higher order responses) of the generalized stiffness of the semiconductor element from changes in the temperature of the semiconductor element is 50 ppm or less over a temperature range of the semiconductor element that extends at least 100°C **Intrinsic Evidence** '643 Patent: 2:59-3:7, 3:16-26, 5:6-20, 5:31-44, 6:23-29, 8:4-11, 8:24-27, 8:41-45, 8:61-64, 9:27-60, 10:2-22, 10:37-54, 11:15-19, 11:33-36, 11:48-50, 13:25-15:38; Figs. 2a-2c, 3a-3c, 4a-c, 5a-c, 6a-c, 7d, 8d, 15a-15c, 16a-d, and 17. '643 Prosecution History: May 2012 patent application; August 2012 request for participation in the PPH program (including the translation of a March 19, 2012, statement regarding patentability from the National Board of patents and Registration in Finland); and June 2014 Notice of Allowability (including the interview summary with the examiner, the examiner amendment, reasons for allowance, and conclusion).	Defendant respectfully contends that this phrase is invalid as indefinite because the "temperature drift" of the generalized stiffness of the semiconductor element does not include a temperature range. The '643 patent specification expressly defines the claim term "temperature drift" to be associated with a temperature range over which the temperature drift is determined. *See* '643 Pat. at C3:16-20. Thus, without reciting the corresponding temperature range, this claim phrase fails to inform with reasonable certainty those skilled in the art as to the proper scope of the invention and is therefore invalid as indefinite under 35 U.S. C. § 112(b). The temperature drift could correspond to a temperature range of 100°C, or less or more. Indeed, the term temperature drift without a defined temperature range could refer to the maximum excursion of temperature drift within the material over any and all temperature ranges. In the alternative, Defendant proposes the following construction for this claim phrase:

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	Extrinsic Evidence Expert Testimony/Factual Findings: Dr. Meinhart will provide testimony that explains how a person of ordinary skill in the art would understand the meaning of 50 ppm or less variation of the temperature drift of the generalized stiffness. The testimony will also explain how the claim language and other intrinsic evidence indicate that the variation must be viewed over a temperature range that extends at least 100°C. The testimony will further explain that the lack of an explicit reference to a temperature range in the claim constitutes an error that is evident from the face of the patent. In addition, the testimony will explain that the correction is not subject to reasonable debate based on the surrounding claim language and the rest of the intrinsic record, including the original claims and the examiner amendment of claims 29 and 30 in the file history. VTT will seek factual findings from the Court consistent with this testimony.	"the maximum variation over temperature of the effective elastic modulus of the semiconductor element is less than 50 ppm over any and all temperature ranges" **INTRINSIC EVIDENCE:** *See, e.g.*, '643 patent, abstract, C1:19-28, C2:59-C3:11, C3:16-44, C3:33-60, C5:31-44, C6:19-33, C7:14-18, C10:37-41, C12:25-30, C13:25-47, C13:48-65, C14:7-C15:38, C15:26-30, FIGs. 1, 2a-c, 7-11, 15a-c, 16a-d & FI 20115151. **EXTRINSIC EVIDENCE:** "Strength of Materials" Parts I and II by Stephen Timoshenko. Prior art cited in Defendant's P.L.R. 3-4 Invalidity Contentions. [SITIME_VTT_0019969 – SITIME_VTT_0021396]. Expert Testimony: Defendant may offer expert testimony of Dr. Clark Nguyen in a declaration explaining why Defendant's construction is consistent with how a person of ordinary skill in the art would have understood the term at the time the purported invention in the '643 patent was made in the

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		context of the claims, specification, and the prosecution file history. Defendant may also offer testimony of Dr. Nguyen explaining how the "temperature drift" of a material as understood by a person of ordinary skill in the art requires a temperature range over which it can be determined.
"drive or sense means" Claims 1 and 29	"drive means" refers to a class of devices that actuate the semiconductor element, such as a transducer that provides time-varying electrical, mechanical, optical, piezo, or magnetic forces, causing it to oscillate at or near its resonant frequency "sense means" refers to a class of devices that detect the movement of the semiconductor element, such as a transducer that measures electrical, mechanical, optical, piezo, or magnetic signals over time Alternatively, should the Court find that "drive or sense means" is a means-plus-function limitation, VTT proposes the following: Function: The "drive or sense means" either (i) drives the semiconductor element, (ii) senses the semiconductor element, or (iii) drives and senses the semiconductor element. Structure: The structure includes devices that actuate the semiconductor element, such as a	The "drive or sense means" is a means-plus-function limitation. The construction of this limitation is governed by 35 U.S.C. § 112(f). **Function:** The claimed "drive or sense means" performs the function of (i) driving the semiconductor element capable of deflecting or resonating, (ii) sensing the semiconductor element capable of deflecting or resonating, or (ii) driving and sensing the semiconductor element capable of deflecting or resonating. **Structure:** Defendant respectfully contends there are no structures, acts, or materials disclosed in the '643 patent specification that correspond to this claim term's recited function.

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	transducer that provides time-varying electrical, mechanical, optical, piezo, or magnetic forces, causing it to oscillate at or near its resonant frequency. The structure also includes devices that detect the movement of the semiconductor element, such as a transducer that measures electrical, mechanical, optical, piezo, or magnetic signals over time. **Intrinsic Evidence** '643 Patent: 3:12-15, 4:57-5:5, 6:43-58, 7:48-54; FI20115151 (VTT0001985-2053). '643 Prosecution History: May 2012 patent application; August 2012 request for participation in the PPH program (including the translation of a March 19, 2012, statement regarding patentability from the National Board of patents and Registration in Finland); and June 2014 Notice of Allowability (including the interview summary with the examiner, reasons for allowance, and conclusion). **Extrinsic Evidence** Expert Testimony/Factual Findings: Dr. Meinhart will provide testimony that explains the plain meaning of terms "drive means" and "sense means" to a person of ordinary skill in the art, including the class of structures that would be understand from these terms. The	**INTRINSIC EVIDENCE:** See, e.g., '643 patent at C3:12-15, C4:57-C5:5, C6:43-58, C7:48-54 & FI 20115151. **EXTRINSIC EVIDENCE:** Prior art cited in Defendant's P.L.R. 3-4 Invalidity Contentions. [SITIME_VTT_0019969 – SITIME_VTT_0021396].

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	testimony will explain that "drive means" refers to a class of devices that actuate the semiconductor element, such as a transducer that provides time-varying electrical, mechanical, optical, piezo, or magnetic forces, causing it to oscillate at or near its resonant frequency. It will also explain that the term "sense means" refers to a class of devices that detect the movement of the semiconductor element, such as a transducer that measures electrical, mechanical, optical, piezo, or magnetic signals over time. The testimony will further explain how the understanding of one of ordinary skill in the art set forth in VTT's proposed construction is consistent with the intrinsic evidence, dictionary definitions of the terms, and the use of these terms in references cited in the patent. In addition, to the extent necessary, the testimony will explain the claimed function and corresponding structure in the specification, which is consistent with VTT's proposed construction. VTT will also seek factual findings from the Court consistent with this testimony. *2007 Chambers Dictionary of Science and Technology* at 370, 1077 ((ICT) That which controls a master resonator in an oscillator; (Eng) General name for detecting device used to locate (or detect) the presence of matter (or energy, eg sound, light, radio or radar waves))	

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	2008 A Dictionary of Computing at 160, 456 (An electronic circuit, often available in the form of a logic gate, that is capable of providing large currents or voltages to other circuits connected to the driver's output; Another name for transducer) *2009 Collins Dictionary* at 507 ((electronics) A circuit whose output provides the input of another circuit) *2011 Newton's Telecom Dictionary* at 1026 (A device that responds to a physical stimulus and produces an electronic signal.) US Patent App. Pub. No. 2003/0051550, "Mechanical resonator device having phenomena-dependent electrical stiffness" at [0025], [0058], Figs. 4a-b, Claim 16. US Patent App. Pub. No. 2005/0195050, "Temperature controlled mems resonator and method for controlling resonator frequency" at [0160], [0045], Figs. 8A-B. US Patent App. Pub. No. 2007/0188269, "Temperature compensation for silicon MEMS resonator" at [0002], [0060]-[0062], Figs. 3, 4A. US Patent App. Pub. No. 2008/0007362, "Temperature measurement system having a plurality of microelectromechanical resonators	

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	and method of operating same" at [0048]-[0053], [0074]-[0075], [0085], [0129]-[0132], [0134]-[0136], [1061], Figs. 9A-B, 10A-E, 11. US Patent App. Pub. No. 2013/0099629, "Temperature Compensation in a Semiconductor Micromechanical Resonator Via Charge Carrier Depletion" at [0040], [0029], Figs. 7A-B US Patent App. Pub. No. 2006/0255881, "Method for adjusting the frequency of a MEMS resonator" at [0063], [0097]. US Patent App. Pub. No. 2007/0296527, "Temperature controlled MEMS resonator and method for controlling resonator frequency" at [0158], [0044], Figs. 7, 8A-B.	